

9. The method according to Claim 7, including the step of reading out a status of said memory element.

10. The method according to Claim 7, wherein said memory element is addressable.--

IN THE ABSTRACT:

Please add an Abstract of the Disclosure submitted herewith on a separate page.

REMARKS

Entry of the amendments to the specification, claims and abstract before examination of the application is respectfully requested.

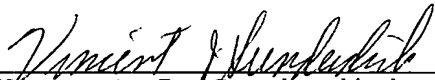
If there are any questions regarding this Preliminary Amendment or this application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and

shortages in other fees, be charged, or any overpayment in fees be credited, to the Account of Evenson, McKeown, Edwards & Lenahan, P.L.L.C., Deposit Account No. 05-1323 (Docket #951/49163).

Respectfully submitted,

September 11, 2000



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Attorney Docket: 951/49163
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MARTIN PELLER ET AL.

Serial No.: NOT YET ASSIGNED

PCT No.: PCT/EP99/01166

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Title: DATA BUS FOR A PLURALITY OF NODES

SUBMISSION OF SUBSTITUTE SPECIFICATION

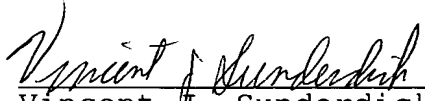
Commissioner for Patents
Washington, D.C. 20231

Sir:

Attached is a Substitute Specification and a marked-up copy of the original specification. I certify that said substitute specification contains no new matter and includes the changes indicated in the marked-up copy of the original specification.

Respectfully submitted,

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DATA BUS FOR A PLURALITY OF NODES

BACKGROUND AND SUMMARY OF THE INVENTION

This application claims the priority of Germany Patent Document
198 10 292.5, filed March 10 1998 and PCT/EP99/0116, filed
5 February 23, 1999, the disclosures of which are expressly
incorporated by reference herein.

The invention relates to a data bus for a plurality of nodes that
are connected to one another via a star coupler. Such a data bus
is known from the unpublished German patent application 19720401.

10 Herein, the nodes are connected to the data bus via
transmitter/sender modules. For optical bus systems, aging of the
transmitter diodes or frequent reverse bending fatigue of the
optical fiber or damage thereto can lead to a reduction of
luminous power to the receiver diode, thereby resulting in
15 malfunctions in the bus traffic. Such an error cannot be
automatically detected and diagnosed.

The object of the invention is to provide a data bus of the
aforementioned art that [allows a] detects any degradation of
transmission quality [to be detected].

20 [The object of the invention is achieved by the means of Claim
1.]

Degradation of the optical transmission quality can be detected by the transmitter/receiver module. [Said] This degradation is characterized, for example, by excessive attenuation or by the difference between dark current and photocurrent (useful
5 current).

[An] According to an advantageous development of the invention, [is described in Claim 2. In this manner,] the frequency of faulty data transmission can be determined.

[A further] In another advantageous development of the invention, 10 [is given in Claim 3. addressability] addressability of the memory element allows the simple detection of which of the node(s) caused a faulty data transmission. [To this end,] As an example, the status of [said] the memory element can be read out by a microcontroller assigned to the star coupler, via a serial
15 interface (SPI, for example).

[Finally] Subsequently, the memory element, for example, after a faulty transmission or after readout by the microcontroller, can be reset. [A] Thus, the subsequently occurring faulty data transmission can be detected and distinguished from the preceding
20 error.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

5 BRIEF DESCRIPTION OF THE DRAWINGS

The invention is [further] illustrated by [means of a] the single figure[. Said figure] which shows detail representation of a data bus according to the invention whereby the mode of transmission of the nodes is monitored.

10 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[At a data bus D are represented two] Two nodes T_n and T_{n+1} [that] are connected via S/E (transmit/receive) modules S/E_n and S/E_{n+1} . [Said] The S/E_n and S/E_{n+1} modules convert optical messages in electric form received from said T_n and T_{n+1} nodes and relay
15 [these] the signals Di_n , Di_{n+1} as input signals to a logical decision gate (AND Gate 1) as the central component of a star coupler K. The number of inputs and outputs [said] of AND Gate 1 corresponds to the number of bus nodes. The output of [said] AND Gate drives all inputs (Do_n , Do_{n+1}) of [said] the S/E_n and
20 S/E_{n+1} modules. [Said] The modules convert these electrical signals into optical signals [and transmit same] for transmission to [said] the T_n and T_{n+1} nodes via optical transmission segments[, not shown].

Degradation of the optical transmission quality due to
[([excessive attenuation[,] or difference between dark current
and photocurrent[)]) U_n can be detected by the transmit/receive
module S/E_n or S/E_{n+1} . During a low level at the optical data
5 input of [said] the module, a detected error is reported at the
data output of the star coupler via a brief low impulse as an
additional input signal Di_n , Di_{n+1} .

This error state is stored at each input of the star coupler in
a buffer (7). [To each signal input is assigned a] A counter is
10 assigned to each signal input. [(8), which, within the scope of
a transmission is incremented] The counter 8 is, within the time
of a transmission, incremented by one if an error is reported by
the corresponding S/E module. [Said] The counters can be read out
and reset via a serial interface (SPI, for example) of a
15 microcontroller. With this function, the optical transmission
paths of all bus nodes can be diagnosed.

The foregoing disclosure has been set forth merely to illustrate
the invention and is not intended to be limiting. Since
modifications of the disclosed embodiments incorporating the
20 spirit and substance of the invention may occur to persons
skilled in the art, the invention should be construed to include
everything within the scope of the appended claims and
equivalents thereof.

Data Bus for a Plurality of Nodes

Patent Claims

1. Data bus for a plurality of nodes that are connected to one another via a star coupler, characterized in that said nodes are connected to optoelectric transducers via an optical transmission segment, said transducers being connected on the load side or on the line side and being situated on said star coupler, that said transducers generate input signals of said star coupler in electrical form, and that said transducers determine the change and/or the absolute value of the electrical useful signal and output an electrical signal to said star coupler when there is a deviation by a given magnitude.
2. Data bus according to Claim 1, characterized by a memory element for the signal of the individual optoelectric transducer.
3. Data bus according to Claim 1, characterized in that the memory element is addressable.
4. Data bus according to Claim 1 or 2, characterized in that the status of the memory element can be read out.

5. Data bus according to one of Claims 1 through 3,
characterized in that the memory elements can be reset.

[key to figure]

S/E Modul n = transmit/receive module n

S/E Modul n+1 = transmit/receive module n+1

Zähler = counter

SPI-Schnittstelle und
Steuerblock = SPI interface and control block